

Abstract Submitted  
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**Island Formation in the Current Rise Phase of CTH Discharges<sup>1</sup>**

J.D. HEBERT, J.D. HANSON, Auburn University, NIMROD TEAM — The 3D extended MHD code NIMROD [1] has been modified to model the Compact Toroidal Hybrid (CTH), a five-field period torsatron/tokamak hybrid device located at Auburn University. In many shots with inductively driven current in CTH, hesitations in the current rise portion of the discharge are observed. V3FIT reconstructions of the current rise demonstrate that the edge rotational transform ( $\iota_{edge}$ ) is near a low order rational suggesting that island formation at or near the edge may be responsible for the current hesitations. The initial stages of the current drive were self-consistently modeled using NIMROD and experimentally relevant vacuum fields, loop voltages, initial temperatures and initial densities. Results show the formation of field-period-symmetry-preserving islands near the plasma edge as well as the coalescence of these islands into larger, symmetry-breaking island chains which modify the distribution of the current in the plasma, phenomenologically similar to what is expected during a current hesitation in the experiment.

[1] C.R. Sovinec et al Journal of Computational Physics, 195, 355 (2004).

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